Review of Gregg Mitman, Marco Armiero, and Robert S. Emmett's *Future Remains: A Cabinet of Curiosities for the Anthropocene* and Raj Patel and Jason Moore's book *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet*

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In the appendix to the French addition of his *Elements of Geology* in 1839, the geologist Charles Lyell introduced a new word into the scientific lexicon: "Pleistocene."[1] He described it as a fusion of the greek words "pleiston" (i.e. πλεῖστος) and "kainos" (i.e. καινός)—a neologism meant to designate the most recent geological epoch. As he described it, the Pleistocene was the epoch "which has elapsed since the earth has been tenanted by man."[2] Over the course of the 1830s, Lyell and his compatriot William Whewell introduced a number of new designations into the geological lexicon: the Eocene ("dawn of the new"), the Miocene (less recent), and the Pliocene (more recent).[3]

Drawing from the work of eighteenth-century natural philosophers such Giovanni Arduino, the -cenes they introduced were attempts to refine an empirically grounded geological chronology. Of course, establishing a geochronology was not without controversy. Neptunists, Catastrophists, Diluvialists all battled for intellectual legitimacy. The stakes were high. The international conversation about geology had scientific, philosophical, and religious implications. For some, it was a matter of the ultimate consequence—the veracity of the Christian scriptures.

In the following decades, there would be debates over the most valid geochronological divisions. Scientists would argue over the most appropriate way to establish chronological boundaries—whether a biological or geological marker was more reasonable. They would dispute the age of the earth. But by the end of the century, it was clear that biblical literalism had lost its hold over the earth sciences. No great flood had ever covered the planet, and Bishop Ussher's "young earth" chronology needed to be abandoned. Scientists increasingly accepted the notion of deep time, of a planet developing over not thousands of years, but millions and maybe even billions of years.

By the late nineteenth century, European scientists had largely abandoned attempts at synthesizing scientific observation and literalistic biblical exegesis. Geological debates were ongoing, but the framework of deep time was widely supported. In the wake of this new paradigm for understanding the planet's history and humanity's place within it came the quotidian debates associated with any disciplinary specialization. At the third meeting of International Geological Congress in Berlin in 1885, for example, the primary conversations focused on geological nomenclature.

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[1] Charles Lyell, *Éléments de géologie*, trans. Tullia Meulien (Paris: Pitois-Levrault at Compagnie, 1839), 621.

[2] Charles Lyell, *Principles of Geology*, vol. 3 (London: John Murray, 1833), 52.

[3] William Whewell to Charles Lyell, 31 January 1831, *William Whewell, D.D. Master of Trinity College Cambridge. An Account of His Writings with Selections from His Literary and Scientific Correspondence*, vol. 2 (London: Macmillan and Co., 1876), 109-111.

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Nevertheless, there were profound cultural and social implications to the idea of geological deep time. It had opened up space for Darwinian explanations of evolution and extinctions—of a biological deep time. In this new order, species were no longer fixed. The idea of hierarchy and order embodied in the Great Chain of Being gave way to a metaphysics of competition, struggle, and change. In this world of constant flux, mountains grew and species evolved and there was no special place for humans outside of the realm of nature. While the biblical story told humanity that a divine entity had created the earth for them to rule, nineteenth-century science told them otherwise. Just as natural philosophy had decentered humanity's place in the universe by overturning the Ptolemaic system, notions of geological and biological deep time decentered humanity's place in the biological world.

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We appear to have entered another "-cenic" moment in which scholars from across the disciplines are debating both the metaphysical and practical implications of recognizing a new geological phase—the Anthropocene. This debate kicked off in 2000 when two Earth System scientists, Eugene Stoermer and Paul Crutzen, began arguing that humans had entered a new geological Epoch. Their claim was that human action had become a geological force that was fundamentally altered planetary systems including the carbon, nitrogen, and phosphorus cycles. The effects of human actions could be seen at a global level, in the atmosphere, in the soil, and in the fossil record.

But it's not easy to name a new geological Epoch. Since 1974, the responsibility for maintaining an international geochronological timeline has rested with the International Commission on Stratigraphy, a unit created by the International Union of Geological Sciences (founded 1961). The group is constantly refining the dating and subdivisions of planetary time into Eons, Eras, Periods, Epochs, and Ages. According to IUGS-ICS, we currently live in the Phanerozoic Eon, the Cenozoic Era, the Quaternary Period, the Holocene Epoch, and the Meghalyan Age. The latter, named officially only in 2018, began 4200 years ago with a great drought that lasted 200 years. The Meghalyan is only the latest of three Ages within the Holocene, which IUGS-ICS has dated to 11,650 years ago to correspond with the end of the last glacial period—and, not insignificantly, with the development of agriculture and eventually urban agglomerations.

For the discipline of geology, replacing the Holocene with the Anthropocene requires scientists to demonstrate measurable anthropogenic chemical, biological, and geological signatures across the planet—to show that these signatures developed in a specific moment in geological time—and then, to convince the scholarly community that the geological rupture is significant enough to designate an epochal break. Taking Stoermer and Crutzen's proposals seriously, the IUGS-ICS's Subcommission on Quaternary Stratigraphy commissioned an Anthropocene Working Group to study whether they should consider formally adopting the new Epoch. Since 2009, this group has published a series of reports that culminated in a recommendation to recognize an Anthropocene that dates to the post-1945 era.

Perhaps unsurprisingly, their work sparked a series of debates in geological circles. Hundreds of scholarly papers have been written on the Anthropocene, and several new journals have appeared: *The Anthropocene Review*, *Anthropocene*, and *Elementa: Science of the Anthropocene*. Some scholars discount the notion of the Anthropocene altogether, claiming that there simply isn't enough evidence to make the argument for a new Epoch. Others point to

various *termini a quo*, noting key anthropogenic geological markers around 50,000 YA, 10,000 YA, 1600, and 1750 among others.

On the surface, the debate over geological nomenclature and dating seems an abstruse disciplinary exercise—a matter of concern for a limited audience. After all, how many people know that they live in the Holocene? And, what would it matter to them if they lived in the Anthropocene? Somewhat surprisingly though, as a concept, the Anthropocene has resonated across disciplinary boundaries and into the policy world. In part, this is due to the increased visibility given to climate change in international policy discussions in recent years. The Anthropocene has become a central framing device for thinking about the politics of"sustainable development," "resiliency," "ecosystems services." It has spawned other neologisms, such as "doughnut economics" and "plastiglomerates." And, importantly, it has increasingly become a topic of popular interest. Google searches for the term have increased exponentially since 2004 [https://public.tableau.com/profile/jason.m.kelly#!/vizhome/SearchesforAnthropoceneoverTime/Sheet1]. And, by June 2014, the *Oxford English Dictionary* formally added it to the English lexicon.

In part, the concept of the Anthropocene has been effective in policy and popular discourse because it evokes a powerful metaphysical framework for understanding modernity. In the dominant discourse about the Anthropocene, humans are re-centered—the primary actors in the earth system—the ultimate agents of the planet's destiny. This framing appeals to philosophical positions that run the gamut from the apocalyptic to the techno-utopian. So, on the one hand, the Anthropocene might be narrated as the inevitable environmental consequence of unabashed rationality and capitalism. On the other hand, it might be narrated as a moment in which bright new futures can be forged through technological innovation and international cooperation—what some have dubbed the "good Anthropocene."

The strength of the Anthropocene as a concept goes beyond metaphysics though. It is also a powerful existential narrative. It speaks to a variety of threats that include sea level rise, changing climate patterns, and degradation of soils. It implicates governments, corporations, and individuals as agents in a centuries-long process that has profound implications for the future of living beings across the globe. In so doing, it provides an ethical narrative that connects local actions to global consequences—but which, because of its universal message, rarely takes aim at individual bad actors. In effect, the Anthropocene has become more than a geological reference point; it is a topos from which multiple narratives of the contemporary world might be constructed.

It's not surprising then that scholars from across the social sciences and humanities have responded to the "Anthropocene" as a framework for imagining the current moment. Unlike geologists, they don't have a formal system for periodization and chronological nomenclature (though, they are quite interested in how dating the Anthropocene reflects worldviews, memory, and power structures). And, except for those social scientists embedded in environmental policy discussions, they tend to focus less on quantitative data and resilience indexes than they do on what the Anthropocene means—both as a concept and a lived experience. It's from the discussions taking place in the social sciences in humanities that critical frameworks have proposed alternative nomencaltures such as the Capitalocene, the Plantationcene—even the Cthulucene.

It's in this context that Gregg Mitman, Marco Armiero, and Robert S. Emmett's *Future Remains: A Cabinet of Curiosities for the Anthropocene* and Raj Patel and Jason Moore's book *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet* can be understood. Both books are pushing back on the dominant Anthropocene narrative. Each makes a case for the limitations of framing the Anthropocene in terms of human-nature dualisms. In the case of *Future Remains*, the focus is on the entanglements between humans and objects as a way to tell stories that open up dialogue about ethics, responsibility, and agency in a period of global environmental crisis. *A History of the World in Seven Cheap Things* examines how human-nature dualisms have been fundamental to the development of capitalism and the exploitation of the planet's living systems. In this sense, these two works fit into a long historiographical tradition analyzing human-nature dualisms that range from Lynn White's classic essay, "The Historical Roots of our Ecological Crisis" (1966) to Carolyn Merchant's exposition of the links between early modern natural philosophy and gender hierarchy in *The Death of Nature* to more recent works that engage with ecocriticism, actor-network-theory, new vitalism, ecofeminism, and new materialism.

Future Remains is the product of a collaboration between the University of Wisconsin Nelson Institute Center for Culture, History, and Environment; the Rachel Carson Center for Environment and Society at Ludwig-Maximilians-Universität in Munich; the Deutsches Museum in Munich; and the Environmental Humanities Laboratory at the KTH Royal Institute of Technology in Stockholm between 2013 and 2016. As part of the Deutsches Museum and Rachel Carson Center's exhibition "Welcome to the Anthropocene: the Earth is in Our Hands," the collaborators curated a series of events including an "Anthropocene Slam" hosted in Madison, Wisconsin. As described in the call for papers,

> "In the spirit of a poetry slam, this event invites scholars and artists to "pitch" objects which could belong in this Anthropocene cabinet of curiosities. Presenters will have ten minutes to explain why their object stands as a representative of this epoch in human and natural history. The audience is then invited to engage with the presenters and their pitched objects, and vote on which pieces belong in the final cabinet."

Installed in 2014, the Cabinet of Curiosities exhibit included 15 objects that captured a range of responses to the Anthropocene.

Future Remains functions as an exhibition catalogue to the Cabinet of Curiosities. An interdisciplinary effort, the editors and contributors act as critical interlocutors in debates surrounding the Anthropocene. With echoes of Deleuze and Guattari, Donna Haraway, and Jane Bennett, the essays concentrate on objects as ways to explore the complex entanglements between human and non-human—in the words of the editors: "to see objects not just through the lens of human agency but through the lives of nonhuman beings that both shape and are shaped by relationships and processes embodied in material forms" (xi).

The book consists of 21 contributions and include analyses of objects in the Cabinet of Curiosities as well as theoretical pieces that contextualize the more focused contributions in a broader context. While the theoretical contributions are quite valuable—in particular Laura Pulido's important essay on racism and the Anthropocene—those that center on objects exemplify the power of "object-stories" to convey complexity and possibility. In Gary Kroll's contribution to *Future Remains*, a feather from a Canada goose killed by its collision with US

Airways Flight 1549 is more than just a "natural" object. It is "snarge"—the bird tissue left over from after striking an airplane. Snarge is a consequence of our "transit-ecological systems," effectively the infrastructure humans create in order to live accelerated lives and impose their "right-of-way" on other species. In their essay, Michelle Mart and Cameron Muir offer a history of the manual pesticide spray pump and its popular origins in the form of the "FLIT gun," marketed to consumers beginning in the 1920s. The pesticide spray pump helped to "domesticate" synthetic pesticides and turned toxic chemicals into icons of modernity and progress. Bethany Wiggin's essay takes us back to Germantown, Philadelphia where, in 1824, a Quaker by the name of Mrs. Smith stitched a quilt that connected her to the histories of empire, dispossession, and slavery. Using the quilt as a framework to reflect on agency, objects, and complicity—in effect, the ethics of the Anthropocene—Wiggin tells us that Mrs. Smith was "caught in a double bind." Like her, "we are sure of our desire to embody the change we want, all the while knowing we are part of the problem" (150).

The analyses in *Future Remains* do quite a bit of work. Their emphases on the socioecological lives of things and creatures in motion—the value systems they express, the histories they embody, and the interconnected experiences they reflect—is the core thread that holds the volume together. As expressed by the editors, one of the goals of the volume was to "disrupt human exceptionalism" in a post-humanistic attempt to subvert human-nature dichotomies. Some essays accomplish this better than others. Tomas Matza and Nicole Heller's "Anthropocene in a Jar" is particularly effective. A jar of sand reveals a North Carolina beach as a hybrid object—the product biogeophysical and sociocultural forces alike. The sand is the product of millennia, the shells of lives ground down by the forces of tides and winds. But, the sand lives on the beach only because of human intervention. Dredging operations "nourish" the coastline, destroying habitats and dislocating animals, in order to provide beach-going humans with a sense of permanence and a place for their hotels and cottages. Despite ocean level rise and the increased frequency of high powered storms, the beach lives on a "the false presumption that modern industrial societies, rather than deep time, will ultimately prevail, and that humans can rework the relations of earth and ocean according to the will of a few without consequence" (27). In all, *Future Remains* is a valuable contribution to the literature on the Anthropocene by providing an entry point to imagine the entangled complexities of environmental and social forces.

In *A History of the World in Seven Cheap Things: A Guide to Capitalism, Nature, and the Future of the Planet*, Raj Patel and Jason Moore also focus on things. But, their "things"—nature, money, work, care, food, energy, and lives—are much more conceptual in nature. As they explain, "Cheap things are thus not really things at all—but strategies adopted by capitalism to survive and manage crises, gambits made to appear as real and independent entities by the original sin of cheap nature."

At the core of their arguments is an accessible and nuanced eco-Marxist framework that rests on several propositions. First, there is not a division between natural and social processes. Rather, humans and nature co-produce each other—an idea that Moore developed in a previous monograph as described as the "web of life."[4] As such, "society" and "nature" are not

[4] Jason Moore, *Capitalism in the Web of Life: Ecology and the Accumulation of Capital* (London: Verso, 2015), 3.

separate. Rather, they are categories for describing relations between the human species, other living and non-living things, and the geophysical systems in which they all exist. Second, capitalism exists only through frontiers. It is at these frontiers where early modern states exercised power through various modes—violence, economics, knowledge, culture—in an effort to transform nature into commodities. The frontier is always a site of crisis, created and reshaped by the power imbalances created through resource extraction and consumption. The centrality of the frontier suggests that capitalism is an inherently imperialist endeavor. Third, in a reimagining of World Systems Theory (what they call "world-ecology," another concept borrowed from Moore's previous work) they understand the development of capitalism as both the co-production of sociocultural and biogeophysical systems and the effort to organize natures (human and non-human alike) in order to extract economic value. Fourth, the Anthropocene as commonly understood might better be named the Capitalocene. For it is capitalism—as a way of thinking about the world, as a way of organizing nature, and as a way of extracting value—that has created the environmental conditions that threaten the planet.

While Patel and Moore's propositions are deeply embedded in theoretical discussions, the authors do not weigh down their book with theory. Instead, they touch briefly on key ideas in the introduction and move quickly to their primary concern—cheapness. In each chapter, Patel and Moore unfold their argument. "Cheap nature" identifies Cartesian materialism, proletarianization, and the privatization of property as key processes for organizing humans and nature to serve the needs of capital. The binaries created by the Cartesian system shaped capitalism's worldview by focusing on substances (i.e. "thinking things" such as the mind and "extended things" such as nature) rather than the relationships between things. Cartesian dualism articulated a powerful framework not only for describing the world but also for classifying and creating hierarchies. For their parts, proletarianization created a labor market while the expansion of private property governed access and control over land.

"Cheap money" describes the quest by European powers for 1) a base primary commodity such as silver, gold, or oil and 2) regulation to guarantee low interest rates. It is in this chapter that external frontiers become essential to European capitalist expansion. Both worker resistance and the depletion of mineral resources in 15th-century Europe led to a quest for silver and gold in the 16th century. Expanding their frontiers to the Americas, European powers brought significant flows of silver. "Cheap money" was premised on the availability of "cheap work" which meant the enslavement of Americans and Africans alike. It was in the context of the plantations that work-time became a central feature of capitalism. Time had to work for capitalists, and they developed techniques to squeeze out value which would soon shape the industrial system in Europe. "Cheap work" was contingent on multiple forms of labor outside of the cash-nexus, including in the household where "cheap care" supported the capitalist infrastructure. "Cheap care" relied on the the creation of a rigid gender hierarchy that controlled women's work, power, and reproduction. As Kate Raworth has observed, the Anthropocene might also be understood as the Manthropocene.

The agricultural system that developed in the transatlantic context was premised on creating "cheap food" in order to maximize profit. "Cheap food" allowed capitalists to pay lower wages to European workers. In the early modern period, this was made possible through the process of enslavement, the deaths of millions, and the institutionalization of modern racism—in other words, of "cheap lives." In the twentieth century, "cheap food" relied on the expansion

of pesticides and fertilizers which exacted a terrific toll on ecosystems around the globe.

While most contemporary writers on the Anthropocene focus on "cheap energy"—especially coal and oil—Patel and Moore convincingly argue demonstrate that "cheap energy" was not the sole cause of the Anthropocene/Capitalocene. Rather, it was part of a complex set of interrelated processes that unfolded over centuries. Their analysis of the cheap things that capitalism created is a study of the relations between these processes. *A History of the World in Seven Cheap Things* avoids the reductionism of human-nature binaries while reminding us of the profound role that sociocultural systems play in shaping biogeophysical systems.

Future Remains and *A History of the World in Seven Cheap Things* are valuable, critical contributions to the literature on the Anthropocene—a literature that has become increasingly vast over recent years. For the scholar or student new to the the concept of the Anthropocene, they provide accessible entry points. For those scholars who are deeply engaged with current discussions about the histories of climate change, science, and the environment, these books are engaging and provocative and likely to generate new debates.